

BEDROCK AQUIFER SYSTEMS OF POSEY COUNTY, INDIANA

The occurrence of bedrock aquifers depends on the original composition of the rocks and subsequent changes which influence the hydraulic properties. Post-depositional processes, such as jointing, fracturing, and solution activity, generally increase the hydraulic conductivity (permeability) of the upper portion of bedrock aquifer systems. Because permeability is commonly greatest near the bedrock surface, bedrock units within the upper 100 feet are typically the most productive aquifers.

Bedrock aquifer systems in Posey County are overlain by unconsolidated deposits of varying thickness. Most of the bedrock aquifers in the county are under confined conditions. In other words, the potentiometric surface (water level) in most wells completed in bedrock rises above the top of the water-bearing zone.

The yield of a bedrock aquifer depends on its hydraulic characteristics and the nature of the overlying deposits. Shale and clay act as aquitards, restricting recharge to underlying bedrock aquifers. However, fracturing and/or jointing may occur in aquitards, which can increase recharge to the underlying aquifers. Hydraulic properties of the bedrock aquifers are extremely variable.

One bedrock aquifer system has been mapped in Posey County. The McLeansboro Group Aquifer System is of Pennsylvanian age.

The susceptibility of bedrock aquifer systems to surface contamination is largely dependent on the type and thickness of the overlying sediments. However, because bedrock aquifer systems may have complex fracturing systems, once a contaminant has been introduced into a bedrock aquifer system, it will be difficult to track and remediate.

Pennsylvanian - McLeansboro Group Aquifer System

The outcrop/subcrop area of the McLeansboro Group Aquifer System covers the entirety of Posey County. This aquifer system, in ascending order, consists of the Shelburn, Patoka, Bond, and Mattoon Formations, all of which are present in parts of the county. The formations of the McLeansboro Group consist of mostly shale and sandstone with minor amounts of siltstone, limestone, clay, and coal. In Posey County, the McLeansboro Group Aquifer System is estimated to range in thickness from about 400 feet where the Bond and Mattoon Formations are absent to about 770 feet in northwestern Posey County.

Most bedrock wells produce water from sandstone aquifers in Posey County, although a few wells produce limited amounts of water from limestone, shale, and coal aquifers. The Shelburn Formation contains the West Franklin Limestone Member, of which a few wells derive water from solution channels in the limestone. The reported yields of these wells are 5 gallons per minute (gpm) or less. Few wells in the county obtain water below this limestone. Overlying the Shelburn Formation is the Patoka Formation, which contains the Inglesfield Sandstone Member. This sandstone aquifer is the principal bedrock aquifer in the county, and is about 50 feet thick in the east part of the county and about 65 feet in the west. The Inglesfield Sandstone is gray to white in drill cuttings and is commonly identified as "white sand" on water well records. The Bond Formation overlies the Patoka Formation and contains the St. Wendel Sandstone Member. The St. Wendel Sandstone aquifer is the second most important bedrock aquifer in Posey County, and is found mainly in areas of high bedrock elevation. The St. Wendel Sandstone aquifer supplies many wells at Sewardville and St. Wendel, but otherwise is not present or water-bearing in many localities.

In general, the McLeansboro Group Aquifer System in Posey County is considered an important ground-water source with most wells producing from the Inglesfield Sandstone. The depth to the bedrock surface in Posey County is generally less than 60 feet, although in places can be greater than 150 feet. Wells completed in this system range in depth from 19 to 377 feet, but are typically 90 to 225 feet deep. The amount of rock penetrated commonly ranges from 50 to 190 feet. Static water levels in wells developed in the McLeansboro Group Aquifer System range from flowing to 300 feet below the land surface, but are generally between 10 and 80 feet below the surface. Domestic wells typically produce between 2 and 20 gpm. However, a few dry holes have been reported. This aquifer system is not very susceptible to contamination from the land surface because of low-permeability strata above water-bearing zones.

